

Installation, Operation & Maintenance Instructions for **“VARIABLE SPEED CONTROL” AUTOMATIC** **HORIZONTAL PRESSURE BOOSTER PUMPSET.**

Variable Speed Controlled Pump



The EQ-DHF system includes controller, pressure transmitter, small diaphragm tank, Built-In-Pipe and is built as a complete, compact, plug and play pressure booster system. This system is capable of varying the pump speed to supply constant pressure.

Pump

- Horizontal multistage non-self-priming centrifugal pump
- All liquid-exposed part are constructed of 304 stainless steel
- Smaller and more powerful than any other pump in its class.

Operation Conditions

- Clean non-flammable and non-explosive liquid without solid granules and fibers
- Liquid temperature : -15°C ~ +100°C
- Highest ambient temperature : +40°C
- Max. Operation pressure : 10bar

Function

- Constant pressure
- Automatic recovery after power failure
- Dry running protection
- FND display of operation status

Electric Motor

- Full-enclosed, air-blast two-pole standard motor
- Protection class : IP55, Insulation class : F
- Standard voltage : 50Hz/60Hz
- Three phase 220-240V/380-415V

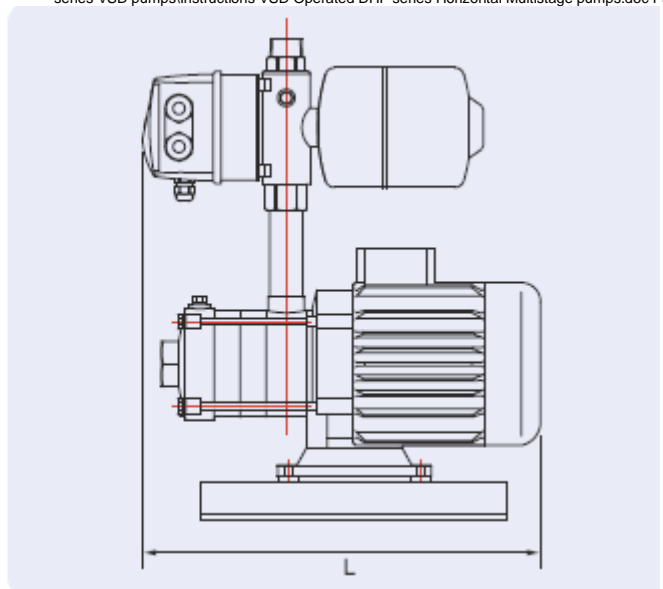
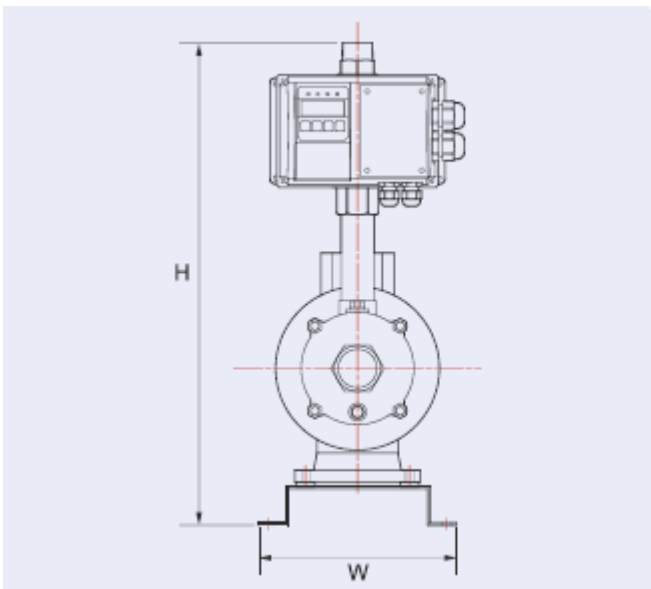
Features & Benefits

- Energy saving
- A wide range of applications
- No-noise & no-vibration
- Easy installations & operation
- All liquid-exposed parts are stainless steel

Application

Small villa, boosting from the top of apartment, pension, motel, house, sprinkler

- Damage to any person or property or any third party due to some of the following conditions -----
- Non operation or non performance of the pump and / or
- Non compliance of the procedures as per respective governing authorities rules & regulations and / or
- Not following the standard engineering practices for installation & operation of the product.



Specification

Model	Power		Flow(m ³ /h)		Head(m)		Diameter(mm)		Dimension(mm)			Weight (kg)
	kW	HP	Min.	Max	Min.	Max			L	H	W	
EQ-DHF 440(M)	1.5	2	2	8	24	53	32	25	422	510	210	25
EQ-DHF 460(M)	2.2	3	2	8	42	80	32	25	496	510	210	30

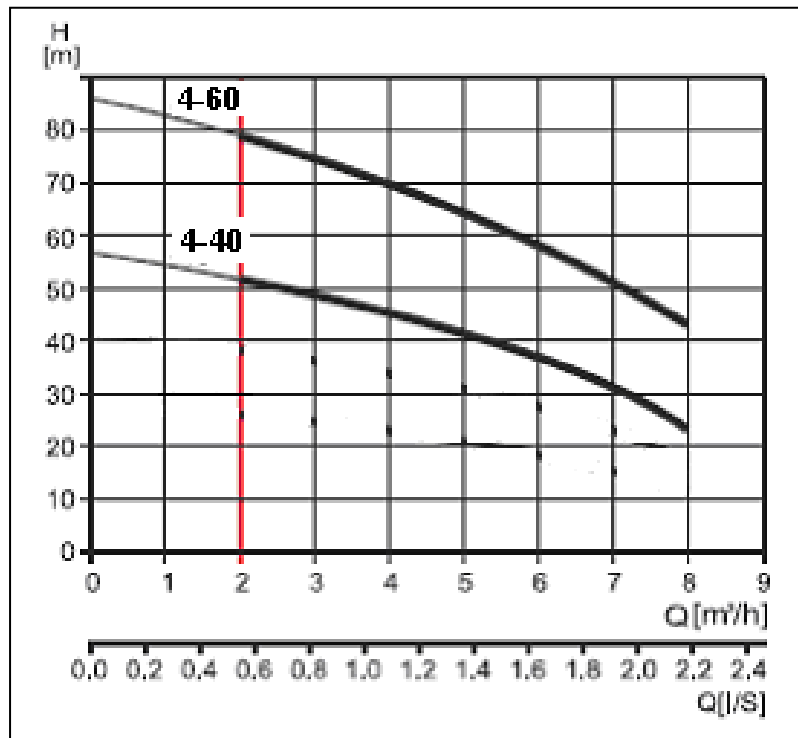
Power Supply: The 230V, 1Ph, 50HZ, power supply point & cable from where power will be supplied to pump unit Must be of minimum 15 Amps rating or bigger.

Suction & Delivery

Pipes & fittings:

Must be of bigger sizes & of suitable pressure rating to ensure Minimum frictional loss in the system to achieve desired flow rate.
 "Wallace Pumps" is happy to suggest the piping sizes based on the information of system layout. Please call us for advice if you wish.

Performance Chart:



Note: Above performance is at pump outlet & is based on factory test results. Actual performance at site may differ based on losses in pipe, fittings, valves that may be present in piping layout.

WARRANTY:

Standard 24 months from date of dispatch, subject to correct storage, installation, operation and maintenance procedures being followed as stated in the data / instructions relating to this pump. Warrantee covers replacement of parts only in case of proven manufacturing faults. Few of the conditions mentioned below are not covered under warrantee. Please ask Wallace pump for full details on Warrantee exceptions.

1) Non performance of the pump due to wrong site conditions and / or wrong installation and / or wrong piping and / or wrong operation. 2) Damage to pump and / or motor due to wrong wiring and / or due to non provision of suitable electrical power supply and / or suitable electrical protection. 3) Damage to any person or property or any third party.

Pump & Piping Installation Instructions:

Please read and follow all these instructions carefully before proceeding with the installation. Installation contrary to instructions below and in other relevant documents will invalidate warranty on pump.

PUMP HOUSING:

Warranty of this pump is void unless the pump is correctly housed and protected from heat, rain, flooding, freezing, humidity & condensation etc. The housing should be weather and vermin proof, have a solid, dry base and be well vented so that motor heat can escape. In the event of a leak the water must be able to drain away from the pump and any property without causing damage.

PUMP POSITION:

The pump must be installed level base as close to the water source as possible with preferably flooded suction. In case of installation with suction lift, the total suction lift (level difference between pump suction port & lowest water level) plus the pressure drop via suction piping, fittings & valves (if any) for maximum flow rate by the pump, should not be more than 4m.

PIPE CONNECTIONS & SUPPORTS:

Pipes should be supported and positioned so that the pump is not stressed by the pipe weight or misalignment. Use compression fittings in conjunction with pipe inserts on suction pipework. Do not over tighten fittings. Ensure that thread tape is not "over the end of fittings and inside the pipework." Fittings with o-ring seals need only hand tightening. Do not use thread tape on o-ring sealed fittings.

PUMPING WATER QUALITY & TEMPERATURE:

Pumping water must be clean without any solids, debris, sand, grit, stones, gravels, tree leaves, paper, plastic and any other solids which may damage the pump and / or reduce the performance of the pump. Such pump damage and / or underperformance are not covered under warranty. Pumping water temp should be at ambient temperature not more 35°C and suitable care must be taken to ensure that during winter water does not freeze in pipes and / or in the pump body. Damage to pump due to freezing of water is not covered under warranty.

FILTERS, UV OR OTHER WATER TREATMENT EQUIPMENTS:

Do not install any filter and/or UV system and/or any other water treatment equipment **in Suction pipework** between the water source and pump.

If necessary install these equipments on the pump delivery pipework only.

Be aware that filters or UV or any other water treatment system greatly reduce the pump delivery flow and pressure and can need frequent servicing. Any Filter/s or UV system or water treatment system used **must not have** pressure drop **more than 50 kPa for max flow rate of 140 LPM** via entire system.

Inadequate flow and / or pressure performance of pump due to wrong or undersize filter, UV or any other water treatment units is not covered under warranty.

If you want filtered drinking water, we suggest you only install a filter in the individual dropper pipe that feeds the tap/s used for drinking water. Label the tap as being designated for this purpose.

PIPING GENERAL:

All pipe sizes mentioned below are expressed as internal diameter. (ID). All pipe threads must be sealed and tightened correctly to prevent leaks. Never reduce the pipe sizes below those stated in these instructions.

Ensure that isolating valves are of a full bore design. Use Wallace foot valves for suction lift applications. Ensure piping is adequately supported. Ensure the delivery piping is rated to at least 9 bar or 90 meters or 130 psi working pressure. The delivery pipe should be flexible at least 1 meter from the pump discharge connection and then rigid pipe such as copper can be used.

Pump flow / pressure performance problems due to wrong or different piping layout is not covered under warranty.

SUCTION PIPING:

In all cases preferably a one piece MDPE suction pipe should be used – Use 1 1/4" pipe for suction pipe up to 5 meter lengths. For lengths of 5 to 10 meters use 1 1/2" pipe. For suction pipe lengths larger than 10 meters contact Wallace Pumps for advice. Minimum pressure rating must be PN9 and the pipe & fittings MUST be suitable for full vacuum conditions. DO NOT USE PVC PIPE. Any fittings used on suction piping must be COMPRESSION TYPE and MUST be used with PIPE INSERTS. DO NOT USE PUSH FIT type fittings on suction piping. Take care to minimise joints. The suction line must be airtight.

There are Three types of suction piping installation as explained in following paragraphs. Please follow the instructions below. Pump damage and / or underperformance due to wrong piping / installation is not covered under warranty.

Flooded Suction Piping: Where the water source is always above the pump level.

The pipe connection in the water tank must be at least 50 mm above the bottom of the tank.

Install a full bore isolating ball valve within 200 mm of the tank to the same size as the selected pipe.

The pipe should be level or can go below then rise to the pump. **Pipes must not rise from the source and then fall to the pump.** Where pipe is buried, ensure valves are accessible for servicing.

A suitable Non Return Valve to be installed in the suction pipe. Ask Wallace Pumps for correct NRV. This NRV to be installed within 300mm to 500mm away from the pump suction port with suitable access for future servicing.

The maximum suction pressure is not to exceed 10 meters (100 kPa)

Suction Lift Piping: The water source is below the pump level.

Follow these instructions precisely.

A 1 1/4" Foot valve (Brass NRV + Strainer) is supplied with the pump. This must be installed at the end of suction pipe. Refer quick installation guide provided. The foot valve must be fully submerged, at all times.

The one piece suction pipe must rise continuously from the foot valve to pump suction port. **Pipes must not rise from the foot valve and then fall to the pump.** Where water tank is partially buried & pump is installed on ground level near tank, a connection through the tank at ground level will be needed to achieve this. Minimise the number of fittings. A suitable priming port must be provided for ease of priming the suction pipe. Refer quick installation guide.

Town Supply Suction:

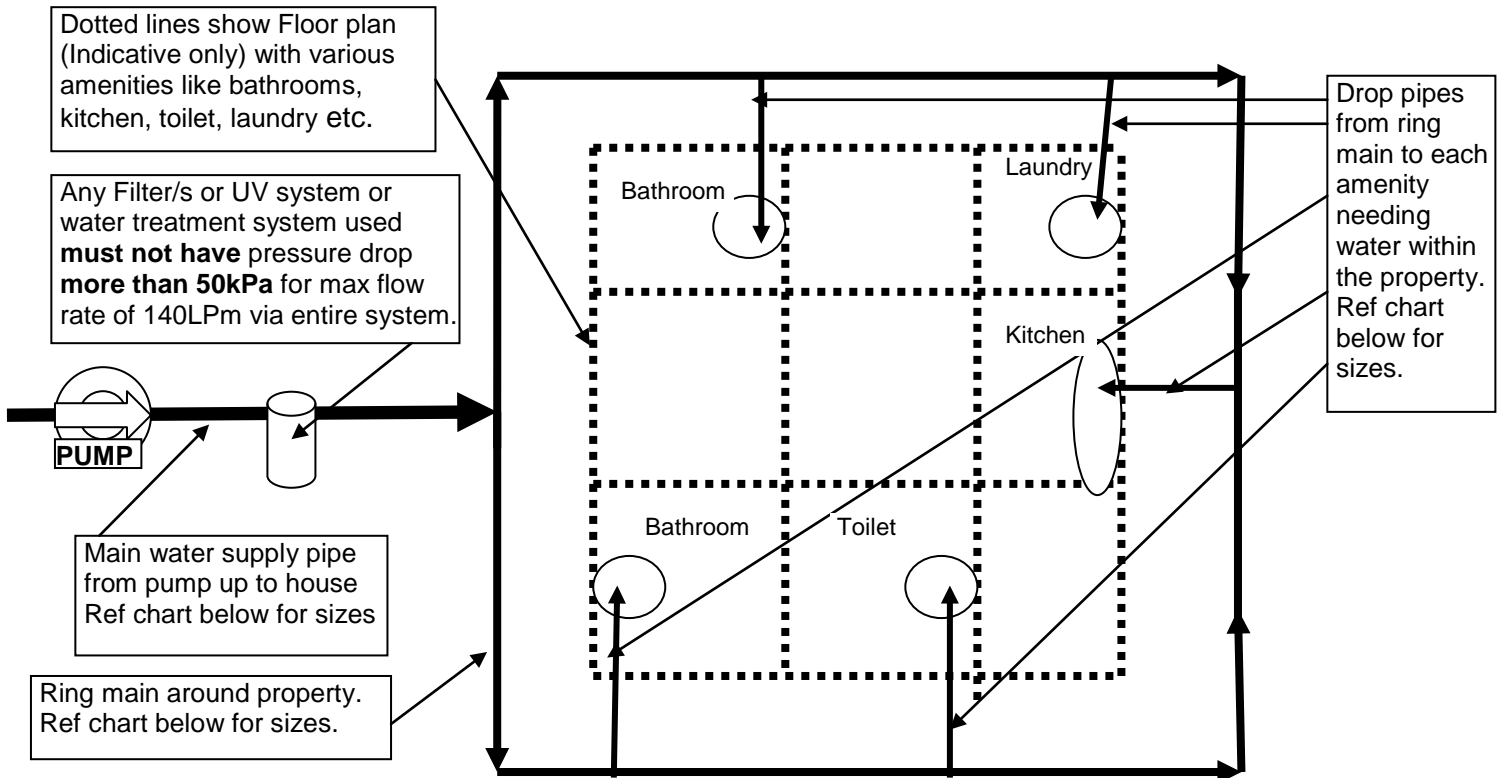
The pump suction should not be directly connected to the pressurised town supply line.

For boosting town supply install a suitable size break tank (minimum 1000 liters or larger) with a full flow ball cock from the town supply. Any other items (like back flow prevention or any other) if required as per local authorities rules and regulations must be installed. Connect the pump suction pipe to the tank as previously described under "Flooded Suction Piping".

PUMP DELIVERY PIPING:

Please note that the delivery piping layout plays a vital role in flow & pressure available at various outlets. Use of small bore pipes and / or dead leg pipes drastically reduces the flow and pressure at outlets and often has serious problems of high fluctuations in flow and/or pressures when multiple outlets are opened or closed. Pump flow / pressure performance problems due to wrong layout and / or inadequate size piping is not covered under warranty. An easily accessible full bore isolating ball valve MUST be installed in delivery line just after the pump discharge point. This should be positioned before any take offs in the delivery piping after the pump. The valve is to be the same bore size as the selected delivery pipe.

Please find below a schematic drawing of the piping layout with recommended pipe sizes. This layout to be followed to get the optimum flow and / or pressure at various outlets within the house.



Recommended pipe sizes for above schematic piping plan:

Type & location of pipe.	Approximate pipe length m	Minimum Pipe sizes to be used
1) Total length of Suction / Inlet pipe from tank up to pump suction. Notes: a) Suction pipe, for flooded suction conditions, should never rise from water source and then fall to pump suction. b) Suction pipe, for suction lift conditions, must continuously rise from water source up to pump suction without any hump or gooseneck. c) Suction pipe to be preferably in single piece without any joints. Any joint or fittings used must be suitable for suction (vacuum) conditions. In other words suction pipe & fittings must be such that no outside air can enter the suction pipe when pump create a vacuum during suction process. Pump problems due to air entering suction pipe are not covered under warrantee. d) Suction pipe & fittings should have negligible head loss for the max flow. Refer detailed pump instructions for more details	Up to 5 m Up to 10 m For suction pipe lengths more than 10m contact Wallace Pumps	1 1/4" Pipe* 1 1/2" Pipe* * Suction pipe to be preferably in single piece without any joints & must be suitable for suction (full vacuum) conditions.
2) Total length of main pipe from pump up to the house.	Up to 10 m Up to 25 m Up to 50 m	1" Pipe 1 1/4" Pipe 1 1/2" Pipe
3) Total length of ring main around the property.	Up to 25 m Up to 50 m	1" Pipe 1 1/4" Pipe

	Up to 100 m	1 1/2" Pipe
	Up to 200 m	2" Pipe
4) Each length of drop pipe to utility from ring main.	Up to 5 m	1/2" Pipe
	Up to 15 m	3/4" Pipe
	Up to 50 m	1" Pipe

POWER SUPPLY:

Provide a **dedicated, fused, switched, 230V, 1Ph, 50HZ** suitably earthed power supply point **rated for min 16 Amps** within 1 m from the pump, with suitable **circuit breaker & power surge protection**, to protect pump from overload & power surge.

Pump motor damage due to inadequate &/or wrong &/or unprotected power supply is **not covered under warranty**. Never use long undersized extension leads from a distantly located power supply point to supply power to pump.

PRIMING:

Before starting the pump, it is essential to prime the entire suction line and the pump body up to the discharge point with water, removing all air in suction pipe & pump body. Follow instructions below. Ensure power is off to the pump.

Flooded suction: Install the suction pipework & delivery pipework as per recommendations. Do not connect the Suction & Delivery pipe to pump yet. Open the tank isolating valve until water comes out from the suction pipe & in process it is flushed clean. Closed the isolating valve. Install the pump as per recommendations. Connect the Suction pipe and delivery pipe to the pump. Open isolating valve at tank and release hexagonal priming / vent plug on the pump body until all the air has been purged out of the pump and water is flowing freely, replace the plug correctly.

Suction lift: Install the suction pipework with foot valve & delivery pipework as per recommendations. Do not connect the Suction & Delivery pipe to pump yet. Fill the entire suction pipe with water removing entire air from suction pipe. Wait and see that the foot valve is holding the water & is not leaking reducing the water level in suction pipe. Install the pump as per recommendations. Connect the completely water filled Suction pipe and delivery pipe to the pump. Remove the hexagonal priming / vent plug on the pump body. Pour water into the pump via the priming hole until full. Wait for five minute and ensure the water level does not drop. If the level drops this would indicate a leak that needs to be rectified. Once suction pipe & pump body is full of water, replace priming / vent plug. A necessary priming port may be provided for ease of priming in future. Ask Wallace Pumps if in doubt.

PRESSURE TANK:

Pressure tank supplied with pump is factory charged with 300 to 350 kPa air pressure. Check the air pressure in tank and ensure it is correct. If necessary re-charge the pressure tank to 300 to 350 kPa air pressure.

INSTALLATION SUMMARY AND CHECK LIST:

1. Read all of the instructions before proceeding with the installation.
2. Pressure tank supplied with pump is factory charged with 300 - 350 kPa air pressure. Check it is correct & if necessary re-charge to 300 - 350 kPa air pressure.
3. Ensure pump is installed & secured in weatherproof, non-floodable, ventilated location with easy access for operation, maintenance and servicing.
4. Ensure suction & delivery piping is installed as recommended & is properly secured without any load on pump.
5. Ensure correct foot valve and/or non return valve is installed in suction piping. Prime the Suction piping fully - check for any leaks – if any leaks noticed rectify - connect the suction piping to pump suction – prime the pump body – check for any leaks – if any leaks noticed rectify.
6. Ensure correct isolating valve is installed in delivery line just after pump discharge. Connect delivery pipe to pump
7. Ensure **power supply** connection to pump is from dedicated, **230V, 1Ph, minimum 16 amps** rated, fused & switched power point **with Overload and Power Surge protections**.

DRY RUN PROTECTION:

This is incorporated in the Variable Speed controller on the basis of Low Pressure Sensing of **0.5 bars or less. (As default factory setting in program no S-06:- Low Pressure Alarm Value)**. As soon as the pressure at pressure transducer goes below 0.5 bars, the controller will stop the pump within 5 sec **(As default factory setting in program no S-09:- Low Pressure Running Time)**. The display will be as “L-P” “**Low Pressure Fault**”. The controller will try **Three Times** to re-start the pump however if the pressure is still less than 0.5 bars the pump will permanently stopped with a display as “L-P” “Low Pressure Fault”.

Eliminate the cause of Low Pressure activation & reset the unit by pressing STOP/RESET.



VARIABLE SPEED DRIVE CONTROLLER:

This is set in the factory based on the informed duty parameters. Constant pressure Set value & some of the other values can be adjusted at site. However before changing any parameter seek confirmation from Wallace Pumps. No parameter should be changed while the pump is running / operating. Do not tamper / open and / or modify the controller hardware. **Opening the unit and/or any modifications / change to the controller without Wallace Pumps prior permission will invalidate the Warranty on the unit.**

The controller will start the pump in response to pressure drop as set in program no “**S-13 Start Deviation**”

The controller will stop the pump when no water is used in response to other parameters as set in the program numbers **S29, S-30 and S-31**.

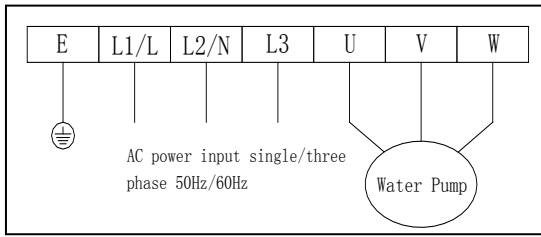
In the event of a power cut the controller will automatically reset and re-start the pump when the power is restored.

VARIABLE SPEED PUMP CONTROLLER SPECIFICATIONS, FUNCTIONS, PARAMETERS AND OPERATION INSTRUCTIONS:

Technical information provided below is for your reference and records only. The controller is fully wired and set in the factory based on the informed duty parameters. Constant pressure Set value & some of the other values can be adjusted at site. However before changing any parameter seek confirmation from Wallace Pumps. No parameter should be changed while the pump is running/operating. Do not open and/or modify the controller hardware. Opening the unit &/or any changes to unit will invalidate the Warranty on the unit.

Circuit Diagram and Terminal box details:

Below are the schematic details of the circuit diagram and terminal box inside the VSD controller for your information only. The unit is fully wired and set in factory and so no action is required at site.



Main Power Circuit Diagram

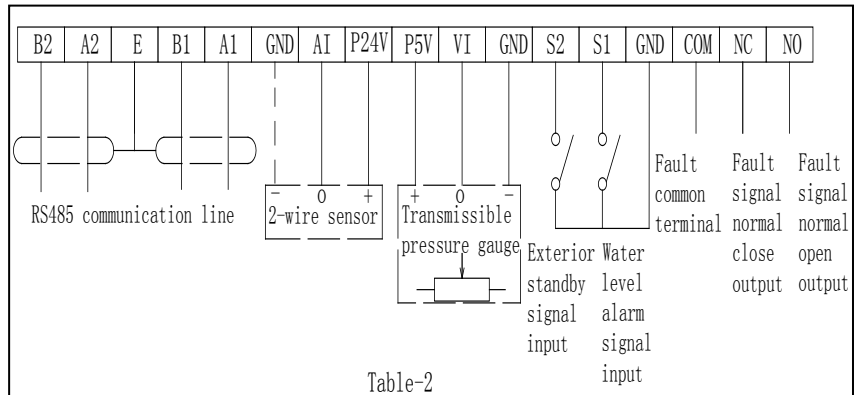


Table-2

Control Circuit Diagram

Controller Keypad and Indicator details:

LED "RUN" light when
a) BLINKING indicates: - Pump is running.
b) SOLID indicates: - Pump is NOT running but ready to start on demand.

LED "STOP" light is ON when pump is stopped by pushing STOP/RESET button on key pad.
To re-start pump press RUN button on keypad

LED "FAULT" light is ON when pump is stopped due to a fault developed in system.
Rectify the reason for fault & then re-start pump by pressing **RUN** button on keypad

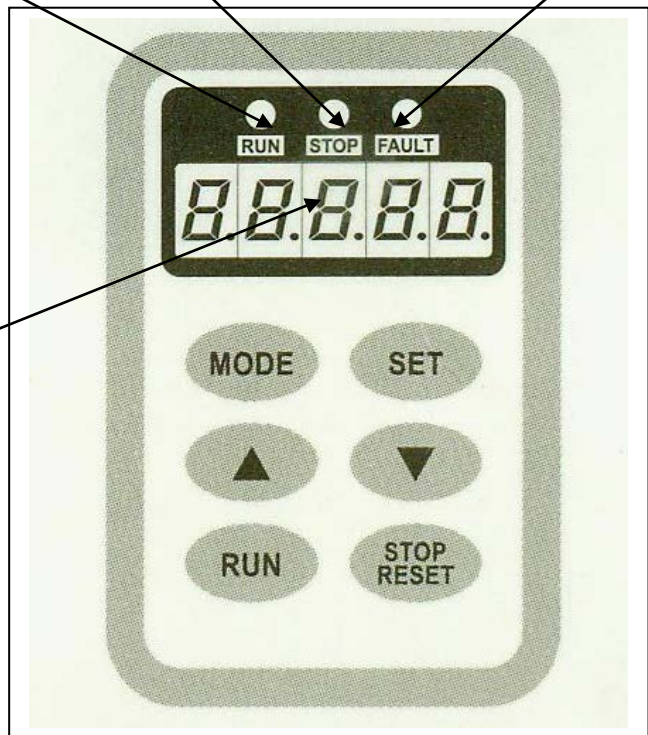
Main Display of status of the pump
 When pump is running display can be set as either Operating frequency in HZ as "H". - - - - Or Constant Set pressure value in Bar as "L". - - - - Or Actual system pressure value in Bar as "P". - - - Or Controller output current in Amps as "A". - - - - Or Motor Voltage in Volts as "U". - - - - Or DC bus voltage in Volts DC as "d". - - - - Or Interior thermal resistor value as "t". - - - - Or Motor operating speed in rpm as "n". - - - - .

When pump is started by pressing RUN button the default display is Operating frequency in HZ as "H"

To change display Press Mode – display will be S-01 – Press Mode again – display will be Set Pressure L. - - - - Press UP & Down arrows to change display between, L, P, A, U, d, t & n as explained above.
 You may keep the display as desired by you.
 If MODE is pressed again display will be back to default display of Hz H. - - - -

When pump is stopped by pressing STOP button, **STOP LED light will glow & display will be StOP.**

When pump is stopped due to any fault in the system, the **FAULT LED light will glow** and the **display will be the respective fault display.** Refer list of fault display in the trouble shooting page at the end of this manual.



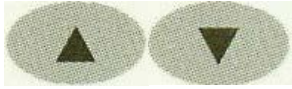
Functions of keys on key pad:



: - Mode key is used / pressed to change mode from one to other.



: - SET key is pressed to display the existing value in the respective function. Also used to Re-Enter the new value of function if changed.



: - UP and DOWN arrow keys are used to increase or decrease value of any function when setting.



: - RUN key is pressed to start the pump from STOP mode or after resetting the Fault.



: - STOP / RESET key is pressed to STOP manually the operating / running pump OR to RE-SET the controller after the Fault is rectified.

Type of Display in the controller:

Display as	Description of the display
H	Output frequency in Hz
L	Set Pressure value in Bar
P	Actual pressure value in Bar
A	Controller output current in Amps
U	Motor voltage VAC
d	DC busbar voltage VDC
t	Interior thermal resistor(NTC) value 0~1023
n	Motor operating speed in rpm

DEFAULT DISPLAY IN CONTROLLER & PROCEDURE TO CHANGE THE DISPLAY IF DESIRED:

When pump is started by pressing RUN button the **default display is Operating frequency in HZ as “H”**

To change display Press Mode – display will be S-01 – Press Mode again – display will be Set Pressure L.- - - -

Now press UP & Down arrows to change display between, L, P, A, U, d, t & n as explained above.

You may keep the display as desired by you.

If MODE is pressed again display will be back to default display of Hz H.- - - -

PROCEDURE TO CHANGE THE CONSTANT PRESSURE SETTING IN THE CONTROLLER:

All the parameters are set in the factory based on the informed duty parameters. Constant pressure Set value can be re-set to new value at site. No changes to be made while the pump is running / operating.

The constant pressure value “L” is set in the factory based on the informed actual duty conditions or other wise **4.0 bar (400kPa) as default value.**

In case you need to change this setting please follow the procedure below. Please ensure that the new constant pressure setting value is within the operating performance range of the pump. **Please check with Wallace Pumps before proceeding. Damaged to pump due to wrong setting is not covered under warranty.**

Example: - Suppose you need to change the constant pressure setting value “L” from 4.0 bar to 3.5 bar.

- 1) Stop the pump in case operating by pressing STOP/RESET button. Display will be “StOP”
- 2) Press the MODE button. Display will be “S-01”.
- 3) Press SET button. Display will be “L-4.0” which is the existing setting of constant pressure of 4.0Bar.
- 4) Use the Down Arrow keys to change the setting from 4.0 to 3.5 bar. Up arrow keys used to increase
- 5) Press SET button to re-confirm and re-set the value of constant pressure from 4.0bar to 3.5 bars.
- 6) Press MODE button twice to bring display as stop “StOP”.
- 7) Press RUN button to Re-Start the pump. **Pump will now operate maintaining constant pressure as 3.5 bar.**

STARTING / SWITCHING THE PUMP “ON”:

Before switching the power ON ensure all installations instructions are followed & suction pipe & pump is fully primed removing all air from the suction piping & pump.

There could be two scenarios for POWER ON as below.

Scenario 1) Power is **switched ON first time** to the pump after **new installation**.

Scenario 2) There is an **existing working pump** and the **main power supply** to establishment was **OFF from power co** and then **it was restored back**.

A) If the value in parameter S-32 is set as "01" (This is factory default setting): Manual Start

In both above scenarios **1) & 2)** the pump will go in stop mode with display as **"StOP"**.

To start the pump the operator need to push the **"RUN"**  button on the controller & pump will start. Once pump start then it will start operating automatically

B) If the value in parameter S-32 is set as "00" : Automatic Start

In both above scenarios **1) & 2)** the pump will wait for few seconds and will automatically start and go in same status (either running or standby mode ready to operate) which was prevailing when the power was switched off.

Once pump starts, the controller will display the actual operating frequency in Hertz. Suppose the actual operating frequency is 60HZ, it will display as **"H.6.0.0.0"**. The small **LED light** above the RUN sign at the top of the controller **will be BLINKING** indicating the pump is running.

Note: The controller has options to display the actual running frequency as **"H"** or SET Pressure as **"L"** or Actual Developed Pressure as **"P"** or Current as **"A"** as set on the controller by the user. Refer detailed operating instructions in following relevant pages.

Allow pump to operate till all air is flushed out of the pump & piping. This is achieved by starting the pump with all outlets closed and gradually opening one outlet which is at the lowest point and is nearest to the pump delivery until all air is purged out via that outlet & good flow is observed. Follow opening one by one outlet in house at higher levels to ensure all air is purged out of the entire plumbing system.

Once a full flow of water without any air is achieved at all the outlets, closed all the outlets. Pump should develop the maximum pressure as set in the controller and if no water is used the controller will start reducing the pump speed slowly and eventually will stop the pump. The display will be **"H.0.0.0.0"** (if Hertz **H** is set as display option) and the small **LED light** above the RUN sign at the top of the controller **will be SOLID ON** and Not Blinking indicating pump is stopped & ready to operate for next cycle when any tap is opened.

Do not run the pump with all outlets closed for more than two minutes.

Never control flow with the suction valve, leave the suction side isolating valve fully open at all times.

POSSIBLE ISSUES / PROBLEMS THAT MAY OCCUR DURING INITIAL START UP OF PUMP & REASONS / ACTIONS TO RECTIFY THESE ISSUES / PROBLEMS:

Possible issue / problem 1):

When pump is started, very little or no water comes out from the nearest open tap. Pressure drops to 0.5 bar or below and pump **stops with a fault indicated on controller as "L-P"** means **"Low Pressure Fault"**.

Some of the possible Reasons for above fault:

- Entire suction line and pump was not fully primed correctly & had entrapped air.
- Wrong fittings or loose joints in suction piping which are allowing air to get sucked-in the suction piping.
- Wrong suction pipe layout rising from water source & then dropping to pump creating air pockets.
- Isolating valve/s in suction line is closed.
- Suction pipe or any strainers / filters on suction piping is blocked due to some foreign material.
- Foot valve or Non Return Valve is jammed & not opening or foot valve not submerged in water.
- No water in the tank.
- Suction Lift too high beyond pump capability.
- Pump Cavitations due to small bore Suction pipe & /or too long suction pipe &/or too many fittings in suction pipe.


Actions:

- Switch off the power to pump.
- Identify and rectify the reason for Low Pressure Fault.
- Once again Re-prime the entire suction piping and pump as explained above and switch on the power to pump. Display will be **"StOP"** Press **"RUN"** button on controller to start the pump & ensure that pump operating normally.

Note: You may have to do repetitive priming procedure to remove entire entrapped air from suction pipe & pump.

Possible issue / problem 2):

Even if complete air is purged out of all piping, when all taps/outlets are closed pump develops the set pressure but **keeps running on and does not stop**.

Above problem indicates that there is some leakage of water somewhere. Stop pump by pressing STOP/RESET  button. Pump will stop and display will be **"StOP"**. Switch off the power to pump.

Some of the possible Reasons for above fault:

- Loose joints or wrong fittings are used in delivery piping or suction piping allowing water to leak.
- Non Return Valve and / or Foot valve is not provided in suction piping OR is leaking backwards OR faulty OR is in open condition due to any foreign material like stone, grit, leaf, paper etc.
- Some outlet / tap is open OR is leaky especially the hot water cylinder over flow pipe, toilet flush valves or any ball cocks feeding any water outlets.
- Leaky or damaged delivery pipeline especially the underground one which can not be noticed from outside.

Actions:

- Identify and rectify the reason for Pump Running On.



- Switch on the power to pump. Display will be “StOP” Press “RUN” button on controller to start the pump and ensure that pump operating normally.

Possible issue / problem 3):

Pump Starts & Stops correctly and also develops Set pressure as displayed in the controller, but the flow at some or all outlets is not adequate.

Above issue is solely due to wrong layout &/or inadequate sizes &/or wrong type &/or blocked piping & is not due to any pump problems & so not covered under warranty. Rectify piping design to get correct flow rate.

DETAILS OF VARIOUS FAULT / TRIP DISPLAYS THAT MAY OCCUR TO PROTECT PUMP OR DUE TO ANY OTHER FAULT & PROCEDURE FOR TROUBLESHOOTING & RECTIFYING FAULT CONDITION:

Refer table below for various ‘DISPLAY which may show up in controller due to tripping / stopping of pump to protect the pump or due to any other fault and possible reasons and actions to be taken to rectify the fault.

If pump stops / trips due to any fault as listed below, rectify the reason / cause for fault / trip.

Once the reason / cause is rectified PRESS “STOP / RESET”  Button and then Press “RUN”  Button to restart the pump.











Restarting the pump without rectifying the reason / cause of fault may damage the controller & / or pump and such damage is not covered under warranty.

Fault Code as displayed in Controller & its meaning	Possible Reasons for Fault occurred	Actions to be taken to Rectify the Fault Condition
<p>“Even if all taps on delivery side are closed pump keeps running and does not stop.”</p>	<ul style="list-style-type: none"> - Water leaking on delivery side via leaky tap or toilet valve or hot water cylinder over flow pipe or loose fitting on delivery pipe or damaged underground delivery pipe. - Built in Non Return valve leaking backwards due to foreign material. - Values set in program no S-29, S-30 & S-31 may be incorrect. 	<ul style="list-style-type: none"> - Check all possible areas on delivery side for any leak and rectify the leak. - Check & ensure built in Non Return valve is sealing correctly & not leaky - Check with Wallace pumps and reset correct values.
<p>“L-P” :- “Low Water Pressure” Pressure sensed by pressure transducer is equal to or less than 0.5 bar which is set in the program no “S-06”.</p>	<ul style="list-style-type: none"> - No water in supply tank. - Suction pipe &/or pump has air. - Loose fittings/joints on suction pipe. - Wrong suction pipe layout. - Suction line Valve closed / blocked. - Suction pipe blocked by debris. - Blocked Strainers/filters on suction. - Foot valve / NRV is blocked or jammed & not opening. - Foot valve not submerged in water. - Suction lift too high beyond limit. - Suction pipe bore too small & / or suction pipe length too long. - Value set in program “S-06” is high. - Pressure sensor is loose or not installed correctly or not wired correctly or is faulty. 	<ul style="list-style-type: none"> - Check water level in supply tank. - Remove air from pipe &/or pump. - Check fittings/joints on suction pipe. - Check/correct suction pipe layout. - Check suction line valve & rectify. - Check & clear / clean suction pipe. - Check & clean strainers / filters. - Check & rectify. - Check & rectify. - Check suction lift capability of pump - Check & ensure suction pipe bore & length is as recommended. - Check & reset correct value in S-06. - Check for correct installation and wiring of pressure sensor. Replace it if found to be faulty.
<p>“H-P” :- “High Water Pressure” Pressure sensed by pressure transducer is equal to or more than the value set in program no “S-05”.</p>	<ul style="list-style-type: none"> - Value set in program “S-05” is low. - Pressure sensor is loose or not installed correctly or not wired correctly or is faulty. 	<ul style="list-style-type: none"> - Check & reset correct value in S-05. - Check for correct installation and wiring of pressure sensor. Replace it if found to be faulty.
<p>“L-L” :- “Low Water Level” Low water level in supply tank.</p>	<ul style="list-style-type: none"> - Low water level sensed by level sensor if it is installed in water tank. - Enough water in tank however value set in program no “S-21” does not correspond to type of level sensor installed. - Level sensor is not installed in Water tank however value set in program no “S-21” needs installation of level sensor. - Wrong type of level sensor is used not matching with setting in “S-21”. 	<ul style="list-style-type: none"> - Check water level & top up to correct level. - Check & reset correct value in program no “S-21”. - Check & reset correct value in program no “S-21”. - Check & install correct type of level sensor.
<p>“o-C” :- “Over Current” Pump motor drawing high current.</p>	<ul style="list-style-type: none"> - Motor impedance and / or insulation may have some issues. - Motor may be getting overloaded. - Supply Voltage below the limit. - Acceleration &/or deceleration time 	<ul style="list-style-type: none"> - Check motor impedance and insulation & ensure they are normal. - Ensure pump is free & not jammed. - Check & ensure correct voltage. - Check with Wallace Pumps and

	in programs S-26 & S-27 respectively may be too low.	extend the acceleration and deceleration time if necessary
“o-uoLt” :- “Over Voltage” Supply Voltage too High	- Supply voltage too High. - Deceleration time in program S-27 May be low.	- Check & ensure correct voltage. - Check with Wallace Pumps and extend the deceleration time.
“u-uoLt” :- “Under Voltage” Supply Voltage too Low	- Supply voltage too Low. - Wiring and connections may not be correct	- Check & ensure correct voltage - Check & ensure correct wiring and Connections
“S-c” :- “Short Circuit” Short circuit issue in system	- Motor impedance and / or insulation may have some issues. - Motor may be getting overloaded. - Supply Voltage below the limit.	- Check motor impedance and insulation & ensure they are normal. - Check whether pump is free to spin & Not jammed - Check & ensure correct voltage.
“oL-trP” :- “Overload Trip” Over torque/load detected in system	- Motor may be getting overloaded. - Load too high.	- Check whether pump is free to spin & Not jammed. - Check & reduce load.
“oH-trP” :- “Overheat Trip” Over temperature detected in system	- Controller overheated due to ineffective cooling. - Overheating due to high Ambient temperature or controller is getting heated due to any other heat source	- Check cooling fan is free and operating correctly. - Check ambient temp and ensure it is within limits OR check for any other source heating the controller.
“no-FLt” :- “Unknown Fault”	- Can occur if communication lines between CPUs is not connected.	- Check and ensure communication connections are correct.
“P-SET”:- “Back to factory setting” All parameter settings will be replaced by default factory settings.	- Values in all programs to go back to default factory settings.	- Press “SET” to go back to default factory setting OR Press “STOP” to ignore & re-set as desired by user.

PROCEDURE TO ACCESS / VIEW EXISTING SETTING VALUES / RE-ENTER NEW SETTING VALUES IN PARAMETERS FROM “S-01” TO “S-85”:

Do not change / modify any values unless prior permission from Wallace Pumps. Any change / modifications to setting values without Wallace Pumps prior permission will invalidate the Warranty on the unit.

- 1) Stop the pump in case operating by pressing STOP/RESET  button. Display will be “StOP”
- 2) Press the MODE  button. Display will be “S-01”.
- 3) Press SET  button to access existing value set in parameter “S-01”.
- 4) Use the UP and Down Arrow keys   to change existing value Higher or Lower only if approved by Wallace Pumps or just view & note existing value.
- 5) Press SET  button to re-confirm & re-set the new setting value & / or to come back to parameter display as “S-01”.
- 6) To go to next parameter “S-02” press UP arrow display will be “S-02”.
Follow step 3), 4) & 5) above to reset new value or view existing setting in parameter “S-02”.
- 7) When any parameter number “S-??” is on display use UP and Down Arrow keys   to move from existing parameter to next higher or lower parameter number. Follow step 3), 4) & 5) above to reset new value or view existing setting in the selected parameter “S-??”.
- 8) Once all setting is done Press MODE button  twice to bring display as stop “StOP”.
- 9) Press RUN button  to Re-Start the pump. **Pump will now operate with the revised (if any) settings.**

VARIOUS PARAMETER VALUES WHICH ARE SET IN FACTORY IN THE VSD CONTROLLER:

Following are all the parameters values set in the factory with their meaning and are for your information only.

Do not change / modify any values unless prior permission from Wallace Pumps. Any change / modifications to these values without Wallace Pumps prior permission will invalidate the Warranty on the unit.

Parameter Number	Details of the function	Setting range And units	Factory Setting	Comments
Settings Parameter Group				
S-01	Constant pressure set value	0 – 10 bar	4.0	This can be re-set to desire level within

				the pump range. Contact Wallace Pumps
S-02	Direction of rotation of pump motor	00 - 01	00	00: Means Forward. 01: Means Reverse
S-03	Anti Freezing function	00 - 01	00	00: Means Disable. 01: Means Enable
S-04	Enter Password (as set in S-37) to access Control Parameter Group	0 – 3999	3990	Seek Wallace Pump permission before accessing Control Parameter Group
Control Parameter Group				
S-05	High pressure alarm value	0 – 20 bar	6.3	Pump will trip if actual pressure becomes more than setting value.
S-06	Low pressure alarm value	0 – 10 bar	0.5	Pump will trip if actual pressure becomes less than setting value.
S-07	Transducer value set range	0 - 20 bar	10.0	Set as per range of the transducer used
S-08	Adjustments to match Actual pressure measured by pressure gauge against the pressure sensed and displayed in controller by the pressure transducer. Factory setting of parameter value for zero pressure by gauge and transducer is 240. Refer comments for settings.	0 - 1000	240	Parameter used to adjust actual pressure against pressure displayed by transducer If actual pressure is higher than display, then reduce the setting value downwards from the factory setting of 240, and if actual pressure is lower than display, then increase setting value upwards from factory setting of 240, to match both actual & displayed pressures.
S-09	Low Pressure running time	00 - 600 Sec	05	Time in Sec after which Pump will trip if actual pressure becomes less than Low Pressure Alarm value set in “S-06”.
S-10	Minimum frequency (as percentage of rated frequency) at which pump will operate during freezing temp if Anti-Freezing function S-01 is set as enable.	10 - 100 %	20	If Anti-Freezing function S-01 in set as 01 (enable) then during freezing temp pump will operate at set % of the rated frequency (20% of rated frequency 50HZ = 10HZ) to avoid freezing within pump.
S-11	PID sampling period coefficient	00 - 1000	20	PID cycle time, smaller the value, more sensitive response.
S-12	PID proportion coefficient (P)	00 - 1000	25	Parameter in response to the level of output in ratio of operating capacity. Bigger the value, faster the response but also bigger vibrations.
S-13	PID integral coefficient (I)	00 - 1000	05	The proportion amount of output deviation. Integral gain, fast response when integral gain is large. If too small it will result in oscillation.
S-14	Start deviation	00 – 10 bar	0.5	When the actual pressure will drop below the Set Pressure by set Start deviation level, the pump will start. As per default settings, if actual pressure drops to (4.5-0.5)=4.0 bar pump will start.
S-15	Communication address for each controller when there is more than one connected in parallel.	00 – 31	00	Master controller is set as : 00. Auxiliary controllers address is set as 01, 02, 03, 04, 05, and 06. If there are more than one controllers in parallel (max allowed are master + 6 more) then correct controller number must be set for each controller. If wrong number is set drive will display error as “NO-FLT”
S-16	Reserved for future use	-	00	Function reserved for future use.
S-17	Reserved for future use	-	00	Function reserved for future use.
S-18	Carrier frequency	Range 00 – 04 00= 2KHz 01= 4KHz 02= 8KHz 03= 12KHz 04= 15KHz	02	Carrier frequency has impact on motor electromagnetic noise & also controller's power consumption & interference. If the ambient noise is greater than the motor noise then reduce carrier frequency which is good for heat dissipation. If carrier frequency is high although it is quiet operation, the overall relative distribution, prevention of interference are also to be considered.
S-19	Alternative running time	00 – 600 hrs	00	Typically applicable for system where more than One pump are operating in parallel. When any pump (Master or Auxiliary) is running continuously, this setting will stop the running pump after

				the set time & will automatically start the idle pump, thus distributing equal load on all pumps and avoiding only one pump operation for a long period of time.
S-20	Auxiliary pump quantity in system	00 - 06	00	Settings to be based on number of auxiliary pumps in system in addition to the master pump 00: Set if Single Master pump system. 01: Set if Master + 1 Auxiliary pump. 02: Set if Master + 2 Auxiliary pump. And so on
S-21	Type of water level control used & connected between S1 & GND terminals of control PCB for Low Water Level Protection and "L-L" Alarm activation	00 - 02	00	Setting to be as below based on type of Low water level protection used in system to trigger Low Level "L-L" Alarm. 00: When No Low Water Level control is used. 01: When Normally Closed (NC) Water level control is used between S1 & GND. 02: When Normally Open (NO) Water level control is used between S1 & GND.
S-22	Delay Time to re-start pump after Low water level situation is rectified.	00 – 100 Minutes	01	Once the Low Water Level situation is rectified, "L-L" alarm will disappear and pump will start automatically based on delay time set in this parameter.
S-23	Type of External control used & connected between S2 & GND terminals of control PCB	00 - 02	00	Setting to be as below based on type of External control used in system to start. 00: Disabled when No external control is used between S2 & GND terminals. 01: When electrical contact pressure switch is used between S2 & GND terminals. When contact closes pump will start & when opens pump will stop. 02: When Flow Switch is used between S2 & GND terminals. When contact closes pump will start & when opens pump will stop after delay time as set in parameter no "S-24"
S-24	Flow Switch off delay time	00 – 600 Minutes	01	When Flow Switch contacts between S2 & GND terminals opens, pump will stop after delay time as set in this parameter.
S-25	Minimum frequency limit up to which pump is allowed to operate.	00 – 400 Hz	20	Although limit can be set as 0Hz, it is highly recommended to set between 20Hz to 35Hz ensuring proper motor cooling & pump working at high efficiency
S-26	Linear acceleration time	0.0 – 3000 Sec	3.0	Constant pressure controller accelerates as per time set in this parameter
S-27	Linear deceleration time	0.0 – 3000 Sec	10.0	Constant pressure controller decelerates as per time set in this parameter
S-28	Fault / Trip Records	READ ONLY		4 fault/ trip records are stored with recent one being displayed first. Use UP/DOWN arrow to view previous 3 fault/trip records
S-29	Sleeping function	00 - 01	01	00: Means Disable. 01: Means Enable This function in combination with S-30 & S-31 parameters ensures that pump will stop when no one is using water.
S-30	Sleeping waiting time	00 -3000 Sec	05	Controller will wait for time in sec as set in this function to see any drop in actual pressure when operating frequency is reduced by % of rated Hz as set in S-31
S-31	Sleeping Frequency proportion	00 – 100 %	02	If actual pressure remains constant equal to set pressure for a period set in S-30, controller will test situation by reducing operating Hz by % of rated HZ as set in

				this function. If drop in actual pressure is noticed controller will keep pump running. If actual pressure remains constant without any drop the controller will reduce speed slowly & eventually stop the pump.
S-32	Start mode selection	00 - 03	01	00: When Power ON, controller will start pump in same status, remembering as it was when power was switched OFF. 01: When Power ON, controller will go in Stop mode. To start press RUN button. 02: External Start/Stop. When S2 & GND terminals are closed pump start & when open pump stops. Also allows stop by using STOP/RESET button on key pad. 03: External Start/Stop. When S2 & GND terminals are closed pump start & when open pump stops. DOES NOT allow stop by using STOP/RESET button on key pad.
S-33	Parameter storage condition	00 - 02	00	00: Allows parameter modifications & values entered are stored in memory even if power is OFF. 01: Allows parameter modifications but values entered are NOT stored in memory when power is OFF. 02: Read Only. Does not allow parameter modifications.
S-34	Selection of function to activate contact output at Com & (NC) Normally Closed and Com & (NO) Normally Open contacts on the controller	00 - 04	01	00: Contact activation for Pump Running 01: Contact activation for Pump Fault 02: Contact activation for Frequency arrival 03: Contact activation for Pump Stop. 04: Contact activation for Pump operating with maximum speed.
S-35	Auto restart time after Low pressure (L-P) Fault	00 – 120 Minutes	00	When set as 00, RESET button need to press to re-start pump after Low pressure (L-P) fault. Reason for L-P fault must be rectified before re-starting pump. When time set between 1 to 120 minutes pump will automatically re-start after set time which was stopped due to L-P fault. Reason for L-P fault must be rectified to avoid damage to pump.
S-36	Reserved for future use	-	00	Function reserved for future use.
S-37	Set the password to access Control Parameter Group	00 - 3999	3990	If desired password number can be changed to one selected within the range
S-38	Enter Password (as set in S-47) to access Motor Parameter Group	0 - 3999	3995	Seek Wallace Pump permission before accessing Motor Parameter Group
Motor Parameter Group				
S-39	Maximum allowed operating frequency for pump	00 – 400 Hz	60	Maximum operating frequency for pump. Please ensure motor type power is suitable and will not be overloaded.
S-40	Motor's rated current as percentage % of constant pressure controller's rated current	00 – 100 %	100	Set 100% when rated current of controller and motor are same. If controller rated current is higher than motor rated current, set lower percentage to match motor current so that motor has correct overload protection
S-41	Motor's rated frequency	00 – 500 HZ	60	Motor rated frequency value must be as mentioned on the motor name plate. Wrong entry of rated frequency will damage motor & the controller.
S-42	Motor's rated voltage output	00 – 100 %	95	Motor's rated voltage output is entered as % of corresponding output voltage.
				00: No Speed.

S-43	Motor pole	00 - 05	01	01: Entered when motor is 2 pole motor 02: Entered when motor is 4 pole motor 03: Entered when motor is 6 pole motor 04: Entered when motor is 8 pole motor 05: Entered when motor is 10 pole motor
S-44	Low speed voltage compensation	00 – 25 %	06	This parameter allows correct working of constant pressure controller in the low-speed operation to compensate output voltage in order to obtain higher torque.
S-45	Total accumulated running time of the pump in Hours	READ ONLY		The display indicates total accumulated running time of pump in hours. This can not be modified
S-46	Reserved for future use	-	00	Function reserved for future use.
S-47	Set the password to access Motor Parameter Group	00 - 3999	3995	If desired password number can be changed to one selected within the range
S-48	Enter Password (as set in S-84) to access Inverter Parameter Group	0 - 3999	10	Seek Wallace Pump permission before accessing Inverter Parameter Group
Inverter Parameter Group				
S-49 to S-82	Reserved for future use	-	00	Functions reserved for future use. Do not change any value that may exist in these functions as any change may damage the pump and / or motor and / or inverter.
S-83	Selection of control mode	00 - 01	00	00: Set 00 when Single pump operation. 01: Set 01 when Multi-pump operation
S-84	Set the password to access Inverter Parameter Group	00 - 3999	10	If desired password number can be changed to one selected within the range
S-85	Selection of pump group control mode	00 - 02	00	00: Set if Single Master pump system. 01: Set if Master + 1 Auxiliary pump. 02: Set if Master + Multi Auxiliary pumps.

STORAGE & INSTALLATION CONDITIONS:

Unit must be stored and / or installed in a weatherproof location and must be protected from heat, rain, flooding, freezing, humidity & condensation. Ambient temperature where unit is stored and / or installed must be within 10 to 35 deg C. Humidity level should be within 20% to 80%. There should not be any condensation or dew formation on the unit and also inside the unit. Power supply must be reliable without any voltage fluctuation and must be from a **dedicated, fused, switched, 230V, 1Ph, 50HZ** suitably earthed power supply point **rated for min 16 Amps** within 1 m from the pump, with suitable circuit breaker &/or other protections to protect pump motor from overload.

Pump motor damage due to inadequate &/or wrong &/or unprotected power supply is not covered under warranty. Never use long undersized extension leads from a distantly located power supply point to supply power to pump.

MAINTENANCE SCHEDULE:

- a) Every Six months check Pumping water is clean without any solids, debris, sand, grit, stones, gravels, tree leaves, paper, plastic and any other solids which may damage the pump and / or reduce the performance. If necessary clean the water tank. Ensure Brass NRV OR Foot valve in suction pipe (as the case may be) is clean & operating correctly.
- b) Every Three months check the air pressure in pressure tank and maintain it to 300 to 350 kPa. If any filters / strainers are used, clean or change the filter cartridge every three months or as suggested by the Filter supplier.

WARRANTY:

Standard 24 months back to base warranty from date of dispatch, subject to correct storage, installation, operation and maintenance procedures being followed as stated in above instructions relating to this pump.

Warrantee covers replacement of parts only in case of proven manufacturing faults. Few of the conditions mentioned below are not covered under warrantee. Ask Wallace pumps for full details on Warrantee coverage & exceptions.

- 1) Non performance of the pump due to wrong site conditions and / or wrong installation and / or wrong piping and / or wrong operation.
- 2) Damage to pump and / or motor due to wrong wiring and / or due to non provision of suitable electrical power supply and / or suitable electrical protection.
- 3) Damage to any person or property or any third party.

Wallace Pumps